REMARKS

Claims 1-46 are pending with claims 16, 17 and 36-46 previously withdrawn, without prejudice, as directed to a non-elected invention. Claims 1, 2-6, 9, 12, 14, 15, 19, 20, 23, 24, 26, 29 and 30 stand rejected as anticipated by U.S. Patent No. 5,315,676 ("Sunagawa"). Claims 10, 11, 18, 21, 22 and 34 also stand rejected based on Sunagawa, under an obviousness rejection. The office action (Paper No. 11) confirms that claims 7, 8, 13, 25, 27, 28, 30, 31, 32 and 33 recite allowable subject matter. The applicants appreciate this favorable indication, yet respectfully traverse the rejections of the remaining claims. Reconsideration is requested in light of the following remarks.

Claim 1 recites an integrated optical device including an optical substrate "defining a non-guiding propagation region for an incident light signal propagating in a primary direction of propagation under total internal reflection at a surface of the substrate." The optical device also includes a diffractive optical element having a plurality of spaced-apart members formed of an optically transparent material. The diffractive optical element is disposed above the surface of the substrate such that "the incident light signal incident on the surface under total internal reflection is reflected into the non-guiding propagation region" along a desired direction of propagation different than the primary direction of propagation. None of the prior art teaches the claimed subject matter.

Sunagawa is the basis for the art rejections, yet Sunagawa clearly does not teach the claimed subject matter. Sunagawa describes a waveguide-based device that is specifically designed for "guiding an optical wave." *Abstract.* The device includes "a grating coupler located on a surface of the optical waveguide in order to radiate the guided optical wave, which travels in the optical waveguide, out of the optical waveguide." *Abstract.*

Guided wave structures like that of Sunagawa are well known and quite different from the subject matter claimed. While they help prevent beam divergence, they are problematic in that they restrict the degrees of movement available for a wave. An unguided wave, in contrast, is able to propagate freely, thereby making it much easier to adapt to different applications.

In the specific case of Sunagawa, planar waveguides are used. These thin profile waveguides are chosen because they confine light to planar propagation, only. These waveguides confine a wave to single-mode propagation. (*See, e.g.*, the Gaussian distribution of wave 14', which travels in a linear fashion along the plane of the waveguide). Planar waveguides guide propagation. They cannot be said to be non-guiding. In fact, among the various optical waveguides, planar waveguides like that of Sunagawa are among the most restrictive on wave propagation.

To clarify the claimed subject matter, the applicants have amended claim 1 to recite that the optical substrate defines "a non-guiding propagation region" and that the diffractive optical element is disposed above the surface of the substrate such that "the incident light signal incident on the surface under total internal reflection is reflected into the non-guiding propagation region."

The figures of Sunagawa confirm that the claimed subject matter is not taught.

Figure 2 shows the light 14 incident from a substrate, but the grating coupler 20 couples that light into the planar waveguide as a guided optical wave. The grating coupler 21 acts on the guided input wave and reflects it "sideways" along the waveguide as a guided wave or out of the substrate. Col. 11, ll. 13-18. In other words, Sunagawa at most teaches individual gratings that couple light from a substrate into a guided wave or from a guided

wave into a substrate. Sunagawa clearly does not teach an optical substrate that defines a non-guiding propagation region for an incident light signal and a diffractive optical element disposed such that the incident light signal on the surface under total internal reflection is reflected into the non-guiding propagation region.

The rejections of claim 1 and claims 2-6, 9, 12, 14, 15, 19, 20, 23, 24 and 26 depending therefrom are traversed and reconsideration requested.[1]

Claim 12 is in condition for allowance, by implication, due to its dependence from claim 1. Nevertheless, to further clarify the claimed subject matter, the applicants have amended claim 12 to recite that the incident light signal is a first unguided wave within the substrate and the diffractive optical element is disposed to reflect the incident light signal as a second unguided wave within the substrate.

Claim 29 has been amended to recite the subject matter of provisionally-allowed claim 32 and is, therefore, in condition for immediate allowance. Dependent claims 30-35 are in condition for immediate allowance as well.[2]

Added claim 47 recites the subject matter of provisionally-allowed claim 13 and is, therefore, in condition for immediate allowance.

[1] The obviousness rejections of claims 10, 11, 18, 21, and 22 are traversed for similar reasons. To sustain a *prima facie* obviousness rejection, the prior art must teach or suggest all claim elements. *See*, MPEP §2142.
[2] The obviousness rejection (claim 34) is traversed, because to sustain a *prima facie* obviousness rejection, the prior art must teach or suggest all claim elements (*see*, MPEP §2142), which clearly is not the case.

Housekeeping

Claim 1 links the previously-identified inventions I and II. As claim 1 is in condition for allowance, the restriction requirement to the linked inventions (I and II) should be withdrawn and all claims examined. *See*, page 3 of Paper No. 7.

In the event there is any remaining issue that the Examiner believes can be resolved by a telephone conference, the Examiner is respectfully invited to contact the undersigned attorney at (312) 474-6300.

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Respectfully submitted,

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